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Report of the

WORKING PARTY ON THE PRINCIPLES FOR FISHERIES MANAGEMENT IN THE NEW OCEAN REGIME

Advisory Committee on Marine Resources Research (ACMRR)

Nantes, France, 14-18 March 1983

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

ADVISORY COMMITTEE OF EXPERTS ON MARINE RESOURCES RESEARCH (ACMRR)

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Nantes, France, 14-18 March 1983

A Preparatory Meeting for the FAO World Conference on Fisheries Management and Development

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS
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PREPARATION OF THE DOCUMENT

This report contains the findings of a Working Party on the Principles for Fisheries Management in the New Ocean Regime. The Working Party was established by the Advisory Committee of Experts on Marine Resources Research at its 10th Session held in Rome in 1981.

An initial draft of this report was prepared by a Drafting Committee which met in Rome, 24 January to 2 February 1983. The final draft was prepared at a meeting of the Working Party which was hosted by the Institut Scientifique et Technique des Pêches Maritimes in Nantes, France, 14-18 March 1983.

ABSTRACT

In the past decade there have been several major changes in the conditions affecting fisheries development and in the perception of fisheries problems. These include increases in the scarcity of the resources, conflicts among groups of fishermen, and awareness of the persistent difficulties in improving the welfare of small-scale fishermen. These changes have led to dissatisfaction with the performance of fisheries management and policy. But they have also, in past, been responsible for the creation of the means for resolution of the problems in the extension of jurisdiction and the acquisition of national authority over the case of the resources.

This Report exercises the important causes of the present inadequacies of fisheries management and policy. It discusses the essential role of government in the management of common property fisheries. The Report then sets forth suggestions and ideas for dealing with the major problems. These are also listed in the Executive Summary.

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EXECUTIVE SUMMARY

Major changes in the conditions affecting fisheries development and in the perceptions of fisheries problems have occurred since the early 1970's. These include:

- The natural limits of most conventional fishery resources appear to have been reached. Major increases in the total world catch of these species cannot be expected, although increases may occur for some stocks where proper management can lead to rehabilitation.

- Conflicts over access to fish stocks have increased. At the international level, extensions of jurisdiction provide a basis for the resolution of some of these conflicts, but problems still remain for shared stocks and new problems are emerging over access to markets.

- Intra-nationally, conflicts continue to increase between and among different groups of fishermen and between fishing and other uses of the waters. Some of these conflicts have been exacerbated by excessive development of large-scale commercial operations which compete with small-scale fisheries for resources, space or markets.

- There is increased recognition that small-scale fishermen, particularly in developing countries, are suffering from persistently low incomes. This is combined with greater awareness of the importance and need for rural development.

- Fishery activities (like other resource industries) have been adversely affected by increases in fuel costs, economic recession and high rates of interest.

- It has become increasingly clear that there are imbalances between fish-catching capacity and resource availability and also between developments in fishing and developments in processing, marketing and distribution of fishery products.

- There is growing recognition that the body of concepts and models used for fisheries management is not particularly adequate for problems of multispecies fisheries, stocks with highly variable yields, fisheries used by communities where there are few alternative opportunities for employment and, in general, the social and cultural characteristics of fishermen groups.

- There is also growing recognition of the need for, and deficiencies in economic and social data.

These changes in developments and perceptions have led to wide-spread frustration and dissatisfaction with the performance of fisheries management and policy, and to a sense of crisis. Simultaneously, however, the development and perceptions have also been responsible, in part, for the creation of means for resolution. With the extensions of jurisdiction, governments are now better equipped than ever before to exercise the kind and degree of authority that is necessary to deal with the problems. But the authority, while necessary, is not sufficient. There must be improvements in the exercise of that authority so as to prevent the continued dissipation of benefits from the resources, to reduce conflict and to improve the welfare of the fishery industries and of those who benefit from them - the fishermen, their communities, and the consumers.

There are several ways in which governments can improve the exercise of their authority to manage the fisheries. These include:

- The development of effective policy:
  - Policies should be expressed as precisely as possible.
  - Policies should be sufficiently broad to take account of all factors relevant to fisheries management.
  - Policies should be based on comprehensive analyses, particularly with regard to what is at stake, who gains and who loses.
  - Policies should be developed in such a way that affected individuals understand how they are affected.
  - Those who are affected should have opportunities to express their views and to participate in policy development.

- The improvement of authority:
  - International institutions need to be improved (or created) for the management of stocks occurring beyond national EEZs.
  - Regional bodies need to be improved (or created) in order to facilitate negotiations on shared stocks.
  - A conference should be convened to examine the future role of regional bodies, so that they can evolve rationally rather than haphazardly.
  - Within national EEZs, mechanisms need to be created to ensure coordination among fishery groups sharing access to a common stock.
  - Governments should examine the organization of their national agencies responsible for fisheries management, in order to determine where the weaknesses may be and where improved coordination of re-arrangement of agencies may be desirable.
  - Governments should create (or improve) independent agencies for monitoring and evaluating management systems.

- The improvement of national competence:
  - Governments need to examine the kind of competencies required to deal with the changes in the conditions and perceptions of fisheries development.
  - Governments need to take steps to improve their competencies particularly with regard to the social and economic aspects of fisheries management.
  - International agencies should seek to improve their support for national training programmes.

- The development of satisfactory fishermen's rights:
  - Governments should give full consideration to the desirability of limiting entry into domestic fisheries and of providing fishermen with satisfactory fishing rights.
  - Means should be found for increasing the responsibility of the fishermen for the management of the fisheries.
  - Where entry into fisheries is limited, directly or indirectly, provision should be made for governments to extract some of the value created by the fishing privileges.
  - Where traditional territorial use rights are in existence and are socially beneficial, these should be supported and reinforced.
  - Governments should seek to develop technologies that facilitate, rather than impede, the development of satisfactory fishermen's rights.

- The improvement of understanding:
  - Governments should evaluate the costs and benefits of sponsoring an International Institute of Fisheries Management.
  - New models need to be developed, particularly with regard to small-scale fisheries in developing countries and taking into account situations where labour mobility is constrained and alternative opportunities for employment are low or non-existent.
  - Models dealing with variability and uncertainty need to be improved.
  - Governments need to improve the data, particularly social and economic, for use in the new and improved models.

- The improvement of enforcement capability:
  - Governments should include information on enforcement costs and problems in the analysis and formulation of management measures.
  - Incentives for self-regulation should be encouraged through measures that improve fishermen's rights to the resources and develop a sense of tenure.
  - Governments need to increase their cooperation on a regional or sub-regional basis in order to improve their enforcement capability with regard to foreign fishing in their zones.

PREFACE

Most coastal States extended their fishery jurisdiction in the late 1970's. The extensions of jurisdiction held considerable promise; the coastal States anticipated reductions or elimination of foreign fishing in their fishery zones and new opportunities to manage and therefore increase economic and social benefits derived from their fishery stocks.

However, past fishery-management failures and anticipation of new management problems arising directly from the extensions of jurisdiction suggested that pervasive and difficult obstacles would limit the benefits that would accrue to fishermen, processors, and consumers of fishery resources. To eliminate or significantly reduce these obstacles, it became evident that new strategies for fishery management would need to be developed.

Recognizing the need to develop strategies for managing stocks under the "new ocean regime" the Advisory Committee of Experts on Marine Resources Research (ACMRR) at its Ninth Session (Rome, 1978), established the ACMRR Working Party on the Scientific Basis of Determining Management Measures. The Working Party produced an Interim Report (FIR/C718) and a final report (FIRM/R236).

The ACMRR Working Party on the Scientific Basis of Determining Management Measures analysed the problem of fishery management and advised the Director-General of FAO in 1979 of the urgent need for FAO to create an environment which would encourage and facilitate the rational management of the world's fishery stocks.

In 1979 the Working Party specifically found that:

> "the fisheries of the world are in a time of fundamental change and tremendous opportunity ... the Coastal States have not yet been able to grasp this opportunity ... If action is not taken soon ... within five years or so ... the opportunity to avoid painful mistakes will be lost, and corrections in the future will be costly, not only in money, but in terms of social dislocation ... In this situation the responsibility of the Food and Agriculture Organization is clear. FAO can and should act now to create an environment in which rational management of the fisheries can be instituted and can flourish. The Working Party believes this will call for the creation of completely new institutions, the modification of old ones and for the intensification and expansion of work already being done, nationally and internationally."

The Working Party on the Scientific Basis of Determining Management measures clarified the concept of "fishery management" as a first step in developing a management strategy and made a number of specific recommendations (pp. 41-45 of their report) concerning the state of fishery management, changing the decision environment, the components of the management system, training, and the structure of and communication within the fisheries management system. Among its recommendations the Working Party suggested the establishment of an International Institute of Fishery Management and a World Conference of Fishery Management which would be a forum for technical discussions and mechanisms for focusing attention on the problem critical to fisheries management.

At its 10th Session in Rome in 1981, ACMRR considered the report of the Working Party on the Scientific Basis of Determining Management Measures and established a new Working Party, the Working Party on the Principles for Fisheries Management in the New Ocean Regime. This Working Party was assigned the following terms of reference:

"(i) Taking account of the Report of the Working Party on the Scientific Basis of Determining Management Measures, to assess the conditions for effective fisheries management, with special attention to the circumstances of the new regime of the oceans.

(ii) To identify the implications of national objectives of fisheries policy for the choice among alternative fisheries management systems.

(iii) To identify the essential elements of a fisheries policy, including laws, institutions and administrative structures required to enable achievement of national objectives, including among other things arrangements for allocating catches where stocks are shared and means of controlling the capacity of fishing fleets.

(iv) To identify the nature of biological, economic and other information required to implement alternative management systems and to evaluate the techniques and costs of acquiring information.

(v) To outline options for the development of national fisheries policies to adapt to the new circumstances of the ocean fisheries."

Following its terms of reference the present Working Party, the Working Party on the Principles for Fisheries Management, took into account the deliberations of the Working Party on the Scientific Basis for Determining Management Measures as well as the present state of world fisheries. The Working Party on the Principles for Fisheries Management noted that as in 1979 general progress in increasing benefits from the world's fisheries is still not apparent. The problem of utilizing authorities implied by extended jurisdiction to control access has not yet been resolved; newly perceived problems have become apparent in managing small-scale artisanal fisheries, in which a significant proportion of the world's food fish are caught; and it continues to be difficult to create an environment in which the rational management of ocean resources can flourish. Whereas, in earlier years, we were content to describe the several well-known problems of fisheries management we now recognize that this is not enough. In addition to simply describing the problems, governments need to take positive steps to implement their resolution. This report is intended to examine ways in which governments can be more effective in utilizing the authorities afforded by extended jurisdiction and increasing societal benefits from fisheries resources.

I. INTRODUCTION: THE NEED FOR NEW STRATEGIES FOR FISHERY MANAGEMENT

Major changes in conditions affecting fisheries utilization and management have occurred since the early 1970's. First, and most significant, nations have extended their jurisdiction over fisheries out to distances of 200 nautical miles. Second, the natural limits of conventional living resources appear to have been reached and major increases in the total world catch of conventionally-caught species is unlikely. Third, the costs of fishing have generally risen owing to, among other things, increases in fuel costs and interest rates. Fourth, during the same period, conflicts over fish stocks and among fishing fleets have increased. Such conflicts have been evident over stocks that occur in the fishing zones of more than one coastal State (the shared-stock problem); among industries within a single coastal State; between fishermen operating at different levels of organization (e.g., artisanal versus industrial); and between fishing and non-fishing uses of the ocean and its embayments. Fifth, development of the industry as a whole has been unbalanced because of excessive emphasis on catching capacity relative to fish processing and marketing capacity and marketing opportunities. Sixth, as a result of extended jurisdiction, over-capitalization in the fishing sector has significantly increased in many countries. And finally, coastal States have generally acquired greatly increased responsibilities for management and enforcement.

These major changes have produced wide-spread frustration regarding the effectiveness of fisheries management and policy. This frustration is exacerbated by the realization that the body of fisheries-management concepts and models is often inadequate for dealing with critical problems like the management of multiple-species fisheries and the variability which exists in fish stocks and markets. Furthermore, there remain serious deficiencies in statistical information and there appears to be a growing tendency, in certain situations, for mis-reporting of catches which constrain effective management and development of appropriate national, regional, and global fisheries policies.

It is further evident that fishery management, in those States where measures have been adopted, has tended to concentrate on total-catch regulation, which is only one part of the management problem. An equally important part involves total-catch allocation. Developing a quantitative analysis of the consequences of different management measures on allocations or distributions of the catch from a fishery requires recognition of the economic and social consequences of management; a lack of this recognition may have been related to past management failures.

In addition to focusing on total catch, rather than on allocation, past management efforts have had a further imbalance because they have tended to be concerned with the more industrialized fisheries, rather than the less industrialized small-scale/artisanal fisheries in which perhaps one-half of the world's food-fish are caught. Because of this imbalance, techniques for managing industrial fisheries are relatively well understood, but those for the small-scale artisanal fisheries appear to be much more difficult owing to the large numbers of fishermen fishing on extensive and sometimes remote coastlines. A recognition of the need to consider artisanal/small-scale fisheries has generated a new concern for the management or improvement of these fisheries, especially in developing countries. One area of concern is that of ensuring that future capital investments in small-scale/artisanal fisheries take into account all consequences of these investments and that they do not stimulate conditions which may be harmful to the coastal communities.

These changes in developments and perceptions indicate that there is a crisis in fisheries and that the need for management is more and more evident. Despite the fact that most coastal States have the authority to manage the stocks, techniques and implementation are wanting. Unless innovative changes are made by the coastal States in their approaches to fisheries management and development potential benefits from the extension of jurisdiction will be severaly limited.

Improvement in fisheries management will initially require emphasis on rationalization of policies and industries and not solely on expansion. Rationalization will require the most efficient economic and social use of the resources rather than simply increasing the catch. In this respect, significant improvements in the comprehensiveness and effectiveness of fisheries policy at all levels of government, nationally and internationally, are most critical. Objectives and priorities must be clearly specified and strategies for development determined on the basis of a comprehensive analysis which encompasses the resources, fleets, gear, fishing communities as well as the processing and marketing sectors.

This report provides a framework for discussion of fisheries-policy failures and suggests approaches that might be effective for improving the performance of fisheries management. The report specifically considers the inadequacies of fisheries policy (Section II), the ways in which governments affect fisheries policy (Section III), and the challenges for future (Section IV).

II. INADEQUACIES OF FISHERIES POLICY

The preceeding discussion points to widespread evidence that fishery policies are frequently unsuccessful in achieving government objectives and in capitalizing upon economic and social opportunities afforded by fisheries resources. Before considering how performance can be improved, the most general weaknesses or inadequacies of current fisheries policies need to be identified.

Accordingly, this section covers the general inadequacies of policies as perceived by the Working Group, taking into account that the success or failure of specific fisheries policies varies among the coastal States. These inadequacies involve: (1) the formulation of objectives, (2) authority, (3) administrative capability, (4) enforcement, (5) fishing rights, (6) understanding, and (7) information. The subsequent section of the report provides an analysis of actions that need to be taken to remedy these inadequacies.

1. Inadequate Formulation of Objectives

Objectives may be inadequate because they have not been sufficiently flexible to change with changing conditions; they may, in the case of multiple objectives, be in conflict with one another; and they may be poorly defined, and hence subject to multiple interpretation.

With respect to flexibility, objectives need to be adjusted to reflect prevailing conditions in world fisheries, notably the increased priority for rationalization of policies and industries rather than simple capital expansion and the increased priority to particular opportunities and problem of small-scale fisheries. Fisheries policies in several countries have evolved over many years, adapting to various circumstances and events. Often such policies have grown cumulatively changing to meet a new need, but retaining most properties of the old system. Regulatory systems and programmes have been put in place to serve a variety of immediate purposes such as, for example, promoting development of new opportunities in resources markets or technology, preventing dislocation of employment, protecting one group of fishermen from another, enhancing incomes, mitigating the effects of resource decline, and controlling excessive expansion. The cumulative result of these responses and innovations in the aggregate is that the broad objectives of fisheries policies have become, by the process of accretion, partly irrelevant and partly incoherent.

With respect to conflicting objectives, fisheries policy, like other areas of economic policy, is often aimed at serving more than one objective and the several objectives are seldom complementary. Efforts to promote employment, for example, are likely to conflict with efforts to promote technological advance or controls on over-expansion of fishing fleets. In such cases, compromises must be made, but they can only be consistent if the objectives themselves are explicit, the involved tradeoffs are indicated, and their relative priorities clear.

These steps towards the making of clear definitions, however, are difficult for administrators. The very act of making objectives explicit, indicating tradeoffs, and establishing relative priorities generally involves decisions that benefit one interest group over another interest group. This is politically risky and hence administrators may be reluctant to define the objectives explicitly.

The problem of objectives mirrors the common discord and frustration over the impact of fisheries policies referred to earlier. Those engaged in the fisheries lack a secure environment for organizing their affairs; governmental programmes are likely to be contradictory and wasteful; administrations are not in a good position to enforce a policy which has not been clearly formulated, openly discussed, and has not received general acceptance; and the degree of success of the policies themselves cannot easily be evaluated. Equally important, those concerned with other economic policies that affect the fisheries lack the guidance they require to harmonize their efforts with the objectives of the fisheries.

Vague objectives increase the difficulty of implementing needed changes. Fisheries-policy reforms are especially difficult because of the interdependence of the welfare of various fishing groups that depend on common resources, the inertia resulting from long-standing traditions and the established commitments of fishermen in terms of capital and careers to the prevailing regime. Policy changes inevitably leave some better off than others or at the expense of others, and often outcomes are uncertain. It is only within the context of well-defined objectives that governments can design constructive policy changes and fishermen can adequately judge their impacts.

For these reasons, unclear objectives in fisheries policy are an important obstacle to improved management.

2. Inadequate Authority

Effective implementation of fisheries policy depends significantly on the degree of jurisdiction of the relevant authorities over the fisheries to be managed. Constraints or impediments to regulatory authority are common limitations on fishery-policy effectiveness.

This problem has a variety of dimensions. Most conspicuous are the numerous examples of divided national jurisdiction over particular fish stocks that occur in the fishery zones of two or more coastal States, stocks that migrate from one fishery zone to another, and stocks that lie partly or entirely outside national jurisdictions. In these cases the efforts of coastal States can be frustrated by the activities of others, and otherwise constructive coastal-State measures to manage stocks or to regulate fishing fleets cannot be implemented. The solution obviously requires international arrangements which can accommodate interest of the countries concerned and enable constructive cooperation.

Responsibilities are also divided at the national level, such as between central and regional governments in federal countries. And even within a particular government, important matters of fisheries policy are often divided among departments concerned variously with fisheries, industrial development, security, finance, agriculture and food.

It cannot be expected that all the governmental responsibilities that bear on the fisheries will be embraced by a single administrative agency. But as long as interdependent responsibilities are divided, effective policy implementation which calls for clear specifications of policy objectives (referred to above), close coordination and communication, and well-defined lines of responsibility and accountability requires special and explicit attention.

3. Inadequate Administrative Capability

To be effective, fisheries policies must not only be well designed but also well administered; indeed, weak administration can produce failure in the most carefully conceived policy.

Weak administration can result from insufficient financial and other support for fisheries agencies, poor organization or incompetent personnel. All of these can be observed in greater or lesser degree in many fisheries administrations.

It is important not only that administrative resources be adjusted to the demands of the policy to be administered but also that policy be designed in light of the administrative resources likely to be available. Thus, also, there is a need for coordination between those responsible for formulating policies and those responsible for administering and enforcing them.

4. Inadequate Enforcement Capability

Enforcement is an essential component of fisheries policy; without it, management and regulation cannot be successful. The burden of enforcement is dependent on the nature of the regulatory measures which are in use. So far the approach to regulation has largely been coercive. The deficiencies of this approach, evidenced by the relatively low degree of enforcement of regulatory measures (nature and quantities of fish caught, mesh size, closed areas), are now patent in many countries, especially in the case of domestic fisheries, and call for the consideration of other

approaches likely to generate better support among fishermen's groups and incentives for self-regulation. As will be discussed later, the assignment to fishermen groups of specific fishing rights is expected to reduce excessive competition and to raise fishermen concern and support for the enforcement of management schemes. The transfer to the fishermen of part of the management function seems to offer a promising opportunity which needs to be investigated and tested.

5. Inadequate Forms of Fishing Rights

Fishing nations are increasingly finding that their efforts to realize greater economic and social benefits from their fisheries are undermined by excessive and wasteful over-expansion of fishing fleets. Over-expansion generates too much fishing pressure which negatively affects resources management capability. It also depresses the economic returns to fishing by spreading revenues too thinly over the excessive labour and capital employed in fishing.

The tendency of fishing fleets to expand beyond the level required to harvest the available catches can be observed in developed fisheries in many countries. Its cause is rooted in the traditional form of fishing rights in which entry into fisheries is uncontrolled and individual fishermen compete with each other for an undefined share of the catch.

Under these conditions, whenever a fishery is profitable, it will attract new entrants, even when the fleet is already excessively large. With the intensification of fishing, conflicts within and among fisheries become more and more common, acute and complex, and there is a tendency to harvest the fish at younger and younger ages - which may reduce overall fish-stock productivity.

Growing recognition and understanding of this complex of special problems of fisheries has induced several governments to adopt new forms of fishing rights. This move is facilitated by the change in the ocean regime (i.e., extended jurisdiction in varying forms) and the authority now acquired by individual countries. Limitations on the number of licences issued (fishing capacity licences), licences that specify the catch that each licence is authorized to catch (fishermen catch quota) and fishing rights over particular areas (area licences) among other innovations have been introduced or suggested as ways to mitigate the problem of over-expansion, as well as to transfer to the fishermen a part of the responsibility for management. Those that have been implemented have had mixed success. Despite their evident potential advantages, their application raises specific issues of a political (allocation of the fishing rights) as well as of a technical (methods for allocating and transferring the rights) nature. The task of designing forms of fishing rights suitable for particular fisheries, that will enable and promote orderly development of fishing industries, remains one of the great challenges of the coastal States.

6. Inadequate Understanding

Design of effective fisheries policy requires a basic understanding of the potential yield of the resources available and of the responses by fishing enterprises to economic influences, including fluctuations in markets, costs and incentives. Failure to achieve desired results from policy measures can frequently be attributed to misunderstanding of these matters. Conspicuous examples can be found in programmes to promote expansion of fisheries sectors which have been frustrated by limits to the biological capacity of the relevant stocks and elsewhere in measures to regulate fishing capacity that proved ineffective because they failed to recognize the flexibility of fishing technology.

To a large extent, under the previous regime, investigations and regulations have been concentrated on the assessment and conservation of the resource. Integrated studies on the various components (resources, gear, boats, etc.) of the fishery sector - including the shore-based activities - are required, as the regulation of an economic activity cannot be based on biological considerations alone.

A related need is to appreciate the influence on the fisheries of forces external to the fisheries sector, notably economic factors such as the trends in trade, changes in interest rates, costs of inputs - notably in fuel - and changes in population. Fisheries policies that fail to take account of such influences are not likely to succeed.

7. Inadequate Information

Proper recognition of opportunities and constraints depend on the availability of sufficient information to understand the potentials and possibilities. Inadequacies in the statistical and other data available, analysis of the data to make it meaningful, and communication of the information are major impediments to improvements in fisheries policy in most countries.

The broadening of the management function - from resource conservation to the optimization of benefits and the regulation of the whole socio-economic sector - has considerably expanded the scope of the information required.

In addition, growing evidences of deliberate under-reporting of catches or mis-identification of species under certain regulatory schemes (catch quota) indicates that the design of efficient information systems cannot be treated separately from that of the overall management scheme.

III. THE ROLE OF GOVERNMENT

The role of government is particularly important in fisheries. With a few exceptions, governments are responsible for ensuring adequate conservation, development, and management of fishery resources.

Because many fish stocks vary in abundance and are vulnerable to heavy fishing, it will never be possible to provide precise in-advance allocations among individual fishermen - despite the advantage of establishing specific fishing rights for particular shares of the stocks or among individual fishermen or small fishermen groups. Even in market economies, full private ownership of fish stocks will be an exception. Thus, governments must accept through their resource-management agencies the responsibilities of stewardship providing for needed stock protection and regulation. Certain opportunities (identified later in this report) exist for assigning some of the regulatory functions to those engaged in fishing but the ultimate responsibility for optimal utilization and resource protection must remain with the government. This implies that governments must equip themselves with research organizations to assess the potential yields of fishery resources and the conditions for achieving their optimum exploitation as well as for monitoring stocks fluctuations and the quality of fish-stock environment. Governments also need to have the administrative and enforcement capabilities required to design and implement appropriate harvesting policies and strategies.

The role of government in organizing or conducting the fishing activity varies widely according to political and economic organization. In the centrally-planned economies, the role of government in managing fishing industries is not greatly different in scope from its role in other industrial sectors; the structure of ownership of the means of production and the organization of productive activity can be determined directly and comprehensively by the responsible government agencies.

In market economies, however, fishing is generally conducted by private enterprises. In some countries, governments can directly intervene through the operation of State fishing corporations. But, in both cases, fisheries are generally characterized by many enterprises exploiting the same stocks. A resource shared in common among various entities without specific ownership or rights among entities that fish the resource is an impediment to orderly development of fishing industries. The existence of unspecified rights creates a special and unique rationale for governmental intervention and control.

Because one of the essential prerequisites for efficient performance through market forces - the means of controlling the inputs required by enterprises is lacking, market forces cannot be relied upon to ensure efficient industrial development. This market failure is manifested in fisheries throughout the world in wasteful over-expansion of fishing power, over-exploitation of stocks and depressed returns to labour and capital engaged in fishing.

Some caution should be exercised when regarding the performance of the classic open-access model which assumes a high degree of mobility of capital and labour to enter into particular fisheries as is apparent in international large-scale offshore fisheries. Entry may be appreciably more restricted in traditional fisheries limited by the operating range of the boats, accessibility to markets, as well as by the regulations and customs developed by coastal communities to deal with their limited opportunities for expansion.

Open access and free competition create special conditions. When the resources are fully exploited, technological innovations leading to gains in efficiency do not result in gains in productivity. Internal modifications such as natural changes in stock abundance as well as external factors such as trends in fish prices or fishing costs, government aids, influence the overall amount of input but basically not individual incomes or stock density.

Governments have responded to these problems in a variety of ways. In the face of excessive pressure on fish stocks, fishing has been prohibited in certain seasons or areas, restrictions on vessels and fishing gear have been imposed to limit their efficiency and total allowable catches have been established. To alleviate low earnings, subsidies and income support for fishermen have been provided. But these measures only address the symptoms of the more fundamental problems of the form of access and the nature of fishing rights.

The point here is that, under open-access conditions, the common property feature of fishing industries creates a special need for governmental intervention. Without appropriate changes, markets' forces will result in dissipation of the potential economic benefits from fisheries. The challenge is to select appropriate corrective measures. Hitherto, most responses have been in the form of increased regulation and restrictions but there are alternatives (identified later in this report) that create incentives for more orderly development with less dependence on direct governmental control.

The extended jurisdiction authority that coastal countries have acquired over the fishery resources which abound off their coastline enables management measures which go beyond and are more efficient than simply setting an overall catch quota. By regulating entry they can aim at exploiting the resources at levels corresponding to explicit fishery policy objectives. By regulating access to the various stocks they can reduce the uncertainty under which individual fishermen traditionally operate, and so create incentives for a change from an opportunistic to a self-regulating behaviour.

The change in the ocean regime has an important effect on fishery development opportunities and practices. The past conditions of open access tended to favour a uniform set of exploitation objectives and fishing patterns - in terms of balance of inputs (capital, labour, technology, fuel) - among countries engaged in international fisheries. Possibly because of their successful development, the model of expansion of large-scale fisheries - including long-distance fleets - in industrialized nations often served as a reference for the promotion of fisheries development in Third World countries. Not always adequate attention has been given to the need to take into account the difference in conditions prevailing in the various developing regions when selecting approaches to fishery development.

Conditions in developing countries are basically different - with differences from region to region - with respect to the availability of capital (notably foreign currencies), labour forces, energy, technology, administrative and research capacities. The role that national fisheries can play for the development of national economies (food supply, employment, exports for foreign currencies, etc.) would also be different. Development of appropriate strategies and nationally suited development plans will require analyses for an objective identification of priorities and constraints and the appropriate determination of input balances enabling an optimum use of domestic resources (human, financial, biological), as the adoption of the wrong mix of inputs (labour, capital, energy, technology) can only add to the production and processing costs already taxed by the general constraints of under-development.

The specific role now widely recognized in small-scale fisheries in developing countries can be understood in that context. Artisanal fisheries enable a more appropriate utilization of the capital and labour forces available to Third World countries. Furthermore, considering the difficulties in ensuring adequate distribution of national wealth towards the low income parts of the populations, assistance projects aiming at directly promoting communities in rural areas may represent a more appropriate strategy for uplifting the status of artisanal fishermen in rural areas.

Considering the special constraints faced by developing countries in promoting the economy and the situations of their populations, governments of those countries generally have more direct interventions to promote the development of their fisheries. Fisheries planning is often done on a

sectoral basis. Fishery promotion should be integrated in the overall strategies for national development, particularly in strategies for food production. This is particularly relevant for those countries which have under-utilized fisheries resources and severe problems of food supply. In this connection it is important that there be an inter-sectoral-oriented approach establishing clearly the contribution of the fisheries sector to the solution of the food problem.

In this field, it seems that past assistance and development programmes tended to give priority to the simple expansion of fishing capacities (e.g., more boats, larger boats, motorization, etc.), whereas, actions on the environment of fisheries (infrastructure, domestic and export markets, fishermen organizations, credit facilities, security in resource accessibility, etc.) constitute a more efficient strategy for government intervention.

In many cases, national development planners have not always paid enough attention to fisheries, while fisheries planners and administrators failed to properly evaluate the possible relationship among competing economic activities and have taken fisheries only as an isolated economic sector. Because of the interaction between fisheries activities and other potential economic activities in coastal areas, an integrated inter-sectoral approach is needed. Integrated development of the coastal area involves management schemes (concerning, for instance, urban and industrial activities, lagoons and canals, agriculture, fishing, aquaculture, recreational activities) which integrate the complex structure of coastal management.

The competence of the authorities responsible for fisheries is naturally restricted to the "fisheries" component of the system, but the harmonious integration of this component within the whole requires the formation of appropriate strategies for area development and the cooperation of professionals from different backgrounds.

On the other side, it is known that a large proportion of artisanal fishermen live in rural areas and provide a large amount of the animal protein that is consumed by rural populations. This relationship is particularly relevant for inland fisheries in many developing countries. Many of the artisanal fishermen also work in agriculture or as part-time farmers or occasional wage earners. They are small producers who enhance their family income through combined economic activities. There is also a certain degree of seasonal mobility of labour from fisheries/agriculture and vice versa also testifying to a need for an integrated approach to rural development.

Concomittant with their responsibilities to promote fishery development consonant with national development objectives, governments control equity of access and utilization of the fishery resources taking into account the fact that various fishermen groups do not always enjoy comparable conditions for access and utilization of domestic fishery resources.

With regard to the less-privileged groups of fishermen, governments need to be cognizant of several generically important problems. These may be simple facts relating to technical issues or they may relate to more complex issues of economic and social development. With respect to technical issues, for example, groups of fishermen that fish the younger age classes of a given stock may be in a strategic position to reduce recruitment to older age classes of the same stock, which may be fished by different groups of fishermen. In addition, both groups of fishermen could collectively exert high levels of fishing effort which would affect recruitment to the younger age classes. Hence development plans need to take into account the inter-relationships among the stocks and the fisheries; if they do not, then unexpected results may occur. With respect to the complexities of economic and social development, government administrations may need to intervene to ensure that certain under-privileged groups with lesser job opportunities are not progressively excluded from certain fisheries because of their initial handicap to compete for the same resources with other fishery segments. Thus, governments in developing countries have had to take special measures for supporting artisanal fishing communities affected by the limited yield of fish stocks available to them and by the encroachment upon the traditional artisanal resource base by trawler fleets which was encouraged by past development programmes.

Finally, the governments of all fishing nations have a direct responsibility for determining and defining the scope of their jurisdictions over fishery resources. This is an especially onerous responsibility because of the complicated international ramifications regarding allocation of many fish stocks and fisheries and the need to adjust national fisheries legislations to the conditions created by

the new ocean regime. Governments, therefore, need to define and modify legal instruments needed to grant fishing rights, to manage allocations and transfer of rights among fishermen groups of various sizes, and to consider transfer of part of the management function to fishermen. But, this process can only be efficient if governments explicitly define their scope of jurisdiction and authority.

IV. CHALLENGES FOR THE FUTURE

The Working Group finds that there are six major challenges that face governments in improving the economic and social efficiency with which their fishery resources are harvested. These are: (a) The Development of Effective Policy, (b) Improving Authority, (c) Improving Competency, (d) Modifying Access, (e) Improving Understanding, and (f) Rationalizing Enforcement.

(a) The Development of Effective Policy

Effective policies are policies that result in the attainment of specified public-sector objectives. Experience has shown that effective policies have a number of common characteristics. Governments and international organizations need to take these into account:

- Policies should be articulated to the fullest possible extent. Performance failures are often ascribed to a "lack of policy". This could mean that in fact policies do not exist, or it could mean policies are perceived not to exist because they are too general and/or do not have sufficient specificity.
- Policies should be sufficiently broad so that they take into account all factors relevant to fishery management. This means the effective fishery policy might have to embrace issues which are important to fisheries, but are traditionally not included in fishery policy. For example, inter alia policy might need to involve energy supply and costs, general food policy and the ways in which lending institutions stimulate capital investment in fisheries (see the extensive discussion on broadening the scope of fishery policy in the report of the Working Party on Scientific Basis for Determining Management Measures).
- Policies should be based upon comprehensive analysis. Experience has shown that inadequate analysis can lead to unsatisfactory results and confusion regarding the intended effect of the policy. Budgetary and human resources must be explicitly directed toward such analyses so that the issues can be fully explored in terms of objectives and the alternative means for obtaining the objectives. Analyses need to be very clear on what is at stake, who gains, and who loses.
- Policies should be developed to ensure that all affected individuals understand how they are affected by the policy. This requires that governments develop mechanisms that communicate effectively the analysis of the various policies that they wish to promulgate.
- Policies need to be legitimate. This means that affected individuals must not only understand the implications of policy, but they should have a forum to express their views and to participate in the policy-development process.

Thus, while each of these seems obvious, the fact remains that policy failures often result from an indequate treatment of one or more of these points.

(b) Improving Authority

Authorities need to be developed and made more precise in several areas. These include international improvements and improvement of the administrative machinery within governments. Improvements in authority at the international level are required. The new International Convention on the Law of the Sea requires that States confer and seek to cooperate on the management of stocks occurring beyond national EEZs - the whales and highly migratory species including certain tunas. There is a strong need for creating new, or improving present international institutions to facilitate this task.

With regard to stocks shared by two or more countries, the requirements for negotiation are clear. An important step that will facilitate these negotiations is the improvement or creation of appropriate regional bodies for the discussion of the issues and for joint assessment of the stocks. A conference should be convened to examine the future role of interested bodies, so that they can evolve according to a plan rather than through accretion.

Intra-nationally, a critical step is that of developing mechanisms for coordination among fishery groups sharing access to a common stock, or management unit. As in the case of internationally shared stocks, the mechanisms must be capable of facilitating decisions - or reconciling disagreements - on the distribution of benefits. In this regard, the system developed in Japan may be particularly helpful as a guide.

The question of achieving satisfactory authority also relates to the administrative machinery within governments. Here, there frequently are weaknesses that require special attention. A first step is to examine the organization of national agencies with responsibilities for fisheries management, in order to determine where the weaknesses may be and where improved coordination or rearrangement of agencies may be desirable.

An important function for all administrative aspects is that of monitoring and evaluating the management system so that appropriate changes can be made in response to changes in objectives, external forces, etc. The monitoring and evaluation task should be done as objectively as possible and, therefore, independent of the agencies responsible for fisheries management. It can be done through special permanent or periodically-appointed commissions composed of representatives of planning and policy-making bodies, financial institutions, investment promotion agencies, universities, and industry leaders. The monitoring and evaluation commission should have full access to information and should have the authority and competence to elicit the cooperation of primary and secondary sources of informations.

(c) Improving Competency

Finally, with regard to administration of national fisheries, governments may need to examine the kinds of competencies available in their agencies. The major events noted in the Introduction - the extension of jurisdiction, the limitations of supply, and the need for focusing on small-scale, artisanal fisheries - call into question whether existing knowledge and experience are adequate to deal with the emerging problems. These events and associated problems indicate that increasing attention needs to be paid to the economic and social characteristics of fisheries. Governments may wish to consider increasing their competence in these areas. National training programmes may be required. And international agencies with a role in providing aid to developing countries should seek to improve their support for national training programmes.

(d) Modifying Access to Fishery Resources

One of the major new directions for change is that of dealing with the condition of free and open access that continues to govern the use of fishery resources in most countries. The establishment of national exclusive economic zones has provided the first step in this process and provides the basic authority for creating national governmental controls over access and providing privileges to fishermen.

These privileges can be created by a variety of means such as licence limitation schemes, fisherman quotas, territorial rights, etc. They provide the fishermen with a greater or lesser degree of exclusive right in the resource and modify the free and open access condition.

There is no question but that the creation of exclusive fishermen's rights may be extremely difficult in some cases and undesirable (at least at present) in other cases. Difficulties will exist in the fisheries which are shared by two or more countries and where decisions have not yet been made as to how the yields or benefits from the stocks are to be allocated. Controls over the numbers of individual fishermen may be undesirable in cases where there are no alternative sources of employment, and where governments wish to increase rather than restrict employment opportunities.

Even in these cases, however, it may be desirable to restrain the number of vessels or amount of fishing gear that can be used in order to prevent an excessive flow of scarce capital resources into the fishery, as well as prevent a loss of employment opportunities.

Thus, in many cases, it is both possible and desirable to initiate the move towards the provision of some form of exclusive rights which would provide fishing privileges to fishermen or groups of fishermen.

The challenges for governments, if they are to pursue this direction, are to find and support the conditions that facilitate increased fishermen responsibility for the management of the resources. Although the natural conditions cannot be changed, governments can choose interventions that accommodate the natural conditions. For example, for sedentary stocks, the choice might be made to create territorial use rights. For stocks with relatively stable yields, individual quotas might be used. And for the more mobile stocks, exclusive rights might be provided to different groups of fishermen with provisions for coordinating councils (as in the case of Japan) to facilitate agreements on allocation, the use of gear, etc.

The social, economic, legal and technological conditions can more readily be shaped by governments. Socially, it would be desirable for the exclusive rights to be made available to integrated, well-knit communities of fishermen. Where this can be done, the fishermen are in a better position to see the benefits of coordinating their activities, to make decisions on the distribution of benefits, and to apply peer pressure to ensure compliance.

In economic terms, with regard to market economies, the conditions should permit the fishermen to transfer their rights so that the allocation of licences or individual quotas can be made through the market mechanism. There should also be provision for collecting revenues from the fishermen, through taxes or user fees, so that the costs of research, administration and, where feasible, resource enhancement, can be covered. The collection of revenues will also be particularly important as a source of funds for buying out some of the superfluous fishing effort.

For centrally planned economies, the allocation of fishing privileges among and within units can be handled by the planning bodies at the appropriate levels.

Important legal conditions are those that permit the distribution of an appropriate degree of authority to the fishermen. Where, for example, traditional territorial use rights systems are already in existence and are socially desirable, these should be supported and reinforced rather than abolished (as sometimes happens).

Government's role in the development of technology can also have a significant influence on attempts to establish satisfactory exclusive rights to fishermen. Technological developments which increase vessel mobility may, for example, make it more difficult to adopt satisfactory licence limitation or fisherman quota schemes. Conversely, development of fixed gear and devices such as artificial reefs and rafts anchored to the bottom will tend to facilitate territorial use rights systems.

(e) Improving of Understanding

Fisheries management under the new ocean regime is a complex process. The complexity is reflected by the fact that the available techniques for management do not match the requirements for management. Thus the difficult task of developing new techniques lies before us. In addition, because of the complexity of fisheries management there are difficulties in reaching a common understanding of the nature of management problem among all of those involved in the management process.

Governments should therefore evaluate the costs and benefits of sponsoring an International Institute of Fisheries Management. The Institute would consist of a small secretariat and operate for five years. Its primary function would be to facilitate the development of new techniques in fishery management and to ensure that administrators and others involved in the management process reached a common level of understanding regarding the principles and techniques of fishery management.

Governments should sponsor the development of new models that are more consonant with the requirements for fishery management under the new ocean regime. These new models need to integrate biological, economic and social factors taking into account variability and uncertainty and little understood socio-economic characteristics such as the mobility of capital and labour. It goes without saying that models are logical or mathematical structures and that their usefulness depends upon the information which is utilized in their construction. Therefore, in addition to sponsoring the development of new models, the governments must also sponsor programmes which provide necessary information for model development.

(f) Rationalizing Enforcement

Enforcement refers to measures which are taken to ensure that fishermen comply with management regulations. Unfortunately, most regulations are impossible to enforce completely because detecting infractions would require the direct and continual observation of each fishing operation. The costs of such intensive enforcement could easily surpass the benefits that would accrue from harvesting the resource.

It is therefore obvious that other approaches need to be explored.

In considering other approaches governments need to place in perspective the costs and benefits of the enforcement process. This can only be done by specifying the cost of enforcement in the context of the entire management operation, and not as is conventionally done, as an entity independent of management.

When this is done it will often be obvious that approaches to management which require less enforcement will be needed.

If fishermen have incentives to comply with regulations, the costs of enforcement can be greatly reduced. This can be accomplished through increasing the involvement of fishermen in the regulation-setting process. A more radical approach is to designate fishermen or a fishermen's group with an exclusive privilege to harvest the stock so that it will be in their self-interest to abide by regulations.

Another critical enforcement problem is that of ensuring that foreign fishing vessels comply with coastal States' regulations when fishing in the coastal State's zones. The resolution of this problem can be facilitated by enhanced cooperation among governments.

Appendix 1

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